

REMARKS

Claims 1-2, 5-6, 9-10, 13-15 and 18 are all the claims pending in the application.

Claims 3, 4, 7, 8, 11, 12, 16 and 17 are cancelled by way of this Amendment.

Foreign Priority:

The Examiner has acknowledged Applicant's claim to foreign priority and has indicated that some of the certified copies of the Priority Documents have been received. Since the present application only claims priority from JP 2003-081317, and the certified copy was filed with the application on March 22, 2004, Applicant respectfully requests clarification from the Examiner on this issue.

Prior Art Rejections:

Claims 1-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Thomenius (6,066,099).

Analysis

Claim 1 is amended to include not only single-beam transmission/reception but also multi-beam transmission/reception which is described in the second embodiment of the application. Further, claim 1 is amended to include subject matter directed to original claims 3 and 4.

Furthermore, amendments to claims 9, 10 and 13 are supported by Figs. 12A and 12B and the corresponding description (page 28, line 21 to page 29, line 21).

Claim 1 is the only claim in independent form; therefore, the following discussion is initially directed to this independent claim.

According to the present invention, one ultrasonic beam is constituted of plural ultrasonic components (unit beams). As shown in Figs. 6A and 6B, each ultrasonic component (unit beam) is formed of one pulse or plural pulses simultaneously transmitted from adjacent ultrasonic transducers. As described in amended claim 1, in the transmission mode, the directivity of each ultrasonic component is changed by changing a number of drive signals to be simultaneously applied to adjacent ultrasonic transducers for forming the ultrasonic component based on a selected one of directivity control patterns stored in a transmission delay pattern storage unit. Similarly, in the reception mode, the directivity of each ultrasonic component is changed by changing a number of detection signals simultaneously obtained and to be used for forming the ultrasonic component based on a selected one of directivity control patterns stored in a reception delay pattern storage unit.

On the other hand, Thomenius et al. (USP 6,066,099) discloses that spatial apodization is used to influence the transmit beam formation and to form two controlled and focused spatially separate beams with a single firing of the transducer array elements. However, Thomenius et al. does not disclose that the directivity of each of the ultrasonic components, which constitute one ultrasonic beam, is changed by changing a number of drive signals to be simultaneously applied to adjacent ultrasonic transducers. Also, Thomenius et al. does not disclose that the directivity of each ultrasonic component is changed by changing a number of detection signals simultaneously obtained and to be used for forming the ultrasonic component.

In view of the foregoing, Applicant respectfully submits that amended claim 1 is distinguishable from Thomenius et al.

Thus, amended claim 1 is patentable.

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No.: 10/805,205

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The remaining rejections are directed to the dependent claims. These claims are patentable for at least the same reasons as claim 1, by virtue of their dependency therefrom.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Ellen R. Smith/

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER

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Ellen R. Smith
Registration No. 43,042